

# Energy and society

[Science](#), [Physics](#)



Q1: a) Approximately 40 percent of all energy consumption is dedicated to electricity generation. Power Grid Management is responsible for distributing this electricity generated from Oil, Coal, Gas, Solar, Wind, and Nuclear energy sources to meet demand. This system was originally composed of individual utility companies which were responsible for training their own operators. Eventually, these individual companies merged into larger cells called power pools which assumed responsibility for controlling multiple utility grids from a single location, such as PJM or the Pennsylvania-Jersey-Maryland which now oversees electrical distribution in numerous additional states. Large-scale federal regulation was then enacted which allowed individuals to construct generators and encouraged the power pools into independent system operators whose supply schedule was determined through auction, a move which further complicated the grid system, though no direct regulation of individual operators was put into place. However, following erroneous actions resulting in catastrophic far-flung blackouts in 2003, the Federal Energy Regulation Commission was empowered to impose new rules and regulations on grid management by way of the North American Electric Reliability Corporation which refined the qualification requirements and licenses needed for human operators (Wald, n. p.).

b) Though Professionals in energy management are highly paid, complying with federal regulations requires a refined skill set including technical engineering knowledge as well as participation in ongoing education and training while maintaining valid licensing. The strict requirement for grid management work limits the scope of recruitment and there are only currently 6, 000 (approx.) qualified professional in the United States. Besides

the technical knowledge and skill required, certain personality traits encourage better performance in this work. The ability to function harmoniously with a group and maintain disciplined adherence to alternating 12 hour shifts and training while performing adequately in power distribution. These personality qualities are the same as those present in people who have previous experience in military settings, as they have these attributes innately and/or have already been familiarized with regimented scheduling and team skills (Wald, n. p.).

Q2:

a) Technical advancements coupled with environmental concerns have led to a new area of energy consumption which electricity distribution managers have had to compensate for in the fluctuating demand patterns present in the power grid. This has led to the creation of a vehicle-to-grid system in which grid operators treat the shifting network of functioning hybrid, fuel cell, and electric car batteries as a single distributed energy source. When at rest, a battery connected to the power grid is able to perform certain functions in energy transference and storage which have an impact on an extended grid of energy supply systems, such as transportation energy usage. These functions have a stabilizing effect on shifting supply and demand. Pulled into the grid, such batteries can maintain a slow, continual energy transfer rate or a quick burst of energy, and can be used to store excess energy produced and be fed back into the network when demand increases without falling below minimum charge levels for vehicle operation. The vehicle-to-grid systems functions through a combination of energy sources and transferences: From the electric grid, to car batteries to

facilitate transport, connecting back to the power grid, and incorporating fuels, such as petroleum into the equation in hybrids and fuel cell transport systems (Levitan, n. p.).

b) The vehicle-to-grid system was not only designed to circumvent any further stress on the energy supplies and distribution that occurs as a consequence of the addition of hybrid and electric vehicles in demand ratios. The way in which this system has been designed is also used as a means of compensating for the inconsistencies inherent to alternate sources of energy generation by means of wind and solar energy. In managing the various elements of energy supply and demand, grid operators have to compensate for alternating levels of electricity production from such sources which limits the usefulness and therefore the need for a large-scale integration of renewable energy into the system on a regular basis. This is due to the fact that the vehicle-to-grid system is able to both utilize energy and act as a stabilizer as vehicles at rest are able to store excess energy in times of surplus energy produced in the system which can then be fed back into the system when demand increases (LaMonica, n. p.).

Resources:

LaMonica, Martin." Vehicle-to-grid venture eV2g connects to utility NRG." cnet. com. Sept 26, 2011. Web. Retrieved Oct 30 2011: [http://news.cnet.com/8301-11128\\_3-20111827-54/vehicle-to-grid-venture-ev2g-connects-to-utility-nrg/](http://news.cnet.com/8301-11128_3-20111827-54/vehicle-to-grid-venture-ev2g-connects-to-utility-nrg/)

Levitan, Dave. " Rising Hopes that Electric Cars Can Play a Key Role on the Grid." yale. edu. Oct 14, 2011. Web. Retrieved Oct 30 2011: <http://e360.yale>.

<https://assignbuster.com/energy-and-society/>

edu/feature/rising\_hopes\_that\_electric\_cars\_can\_play\_a\_key\_role\_on\_the\_grid/2328/.

Wald, Matthew L. " On the Front Lines of the Power Grid." nytimes. com. Oct 25, 2011. Web. Retrieved Oct 30 2011: <http://www.nytimes.com/2011/10/26/business/energy-environment/behind-the-power-grid-humans-with-high-stakes-jobs.html>.